

## Sibling Relationships as Contexts for Delinquency Training in Low-Income Families

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The purpose of the study was to investigate the link between sibling relationships and antisocial behavior in 208 boys from low-income families. Sibling relational attributes and mother–target child (MTC) relationship quality were assessed when the target child (TC) was 10 years old. At ages 11 and 12, TC antisocial behavior and TC reports of peer antisocial behavior were evaluated. Results indicated that MTC negative relationship quality was significantly related to sibling conflict. In turn, sibling conflict was a significant predictor of antisocial behavior; sibling warmth/closeness was related to TC reports of peer antisocial behavior. Findings also indicated that sibling relationship quality was related to antisocial behavior after controlling for MTC negativity. Implications for interventions are discussed.

*Keywords:* sibling relationships, antisocial behavior, peer relationships, parent–child relationships

A number of researchers have highlighted children's relationships with brothers and sisters as important contexts for socialization (e.g., Bank, Burraston, & Snyder, 2004; Dunn, 1999; Patterson, 1986). Specifically, sibling relationships have been identified as potential training grounds for delinquent behavior (e.g., Bank, Patterson, & Reid, 1996; Compton, Snyder, Schrepferman, Bank, & Shortt, 2003; Garcia, Shaw, Winslow, & Yaggi, 2000). Empirical evidence has shown high levels of sibling conflict/coercion and low levels of sibling warmth/closeness to be linked to high levels of child antisocial behavior and low levels of social competence (Ingoldsby, Shaw, & Garcia, 2001; MacKinnon-Lewis, Starnes, Volling, & Johnson, 1997; Stocker, Burwell, & Briggs, 2002). While the importance of siblings in the development of antisocial behavior has been well established, findings are less clear regarding the influence of parent–child relationships on sibling relationship quality. Some studies have found measures of family functioning to be significantly associated with sibling relations (e.g., Brody, Stoneman, McCoy, & Forehand, 1992; Dunn, 1999); whereas in other studies, this has not been the case (e.g., Garcia et al., 2000). In addition, there has been only pre-

liminary evidence suggesting that negative sibling relations significantly increase the risk for child adjustment difficulties after controlling for other measures of family functioning (e.g., Bank et al., 2004). In the present longitudinal study, we examined whether mother–target child (MTC) negativity was related to the quality of sibling relationships (i.e., warmth/closeness and conflict). We also analyzed the link between sibling relations and antisocial behavior and whether this link remained significant after controlling for MTC negativity. Finally, we examined whether the association between sibling relationship quality and antisocial behavior was moderated by MTC negativity.

### Links Between Sibling Relationship Quality and Child and Peer Antisocial Behavior

For most children, brothers and sisters are highly influential figures in their lives, typically serving as valuable sources of support, companionship, and entertainment (Stormshak, Bellanti, Bierman, & Conduct Problems Prevention Research Group, 1996), but also as sources of conflict and negative role models (Patterson, 1984; Rowe & Gulley, 1992; Stormshak et al., 1996). It is not surprising, therefore, that sibling relationships have been posited as critical contexts for delinquency training (e.g., Bank et al., 2004; Dunn, Deater-Deckard, Pickering, Golding, & the ALSPAC Study Team, 1999; Stocker et al., 2002). According to Patterson's (1986) coercion theory, the development of deviant behavior could occur during sibling interactions through two mechanisms. First, modeled from coercive parent–child interactions, sibling relations provide children with opportunities to practice deviant behavior (e.g., reactive aggression)—behavior that would likely go unchecked or even be reinforced in the context of acrimonious and coercive parent–child relationships (Ingoldsby et al., 2001).

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Second, engagement and persistent involvement in coercive sibling exchanges would likely sustain and escalate negative child behavior and perhaps lead to more delinquent-reinforcing experiences outside the home, such as association with antisocial peers. Indeed, children are often introduced to highly antisocial peers through their older (and perhaps deviant) siblings (Rowe & Gulley, 1992). More important, however, children in homes marked by cycles of coercion and escalating hostility may lack the sufficient supervision and emotional bond with their parents to be swayed from deviant peers (Dishion & Bullock, 2002; Patterson, Reid, & Dishion, 1992).

A number of studies have validated that dimensions of sibling relationships are linked to child antisocial behavior and peer relations. For instance, using a sample of predominantly European American children, Updegraff, McHale, and Crouter (2002) found that both control and intimacy in the sibling relationship were significantly related to similar relational dimensions in the children's friendships. In addition, Compton et al. (2003) found that high levels of sibling coercion, assessed when the younger sibling was approximately 6 years old, were significantly related to younger sibling antisocial behavior, assessed 10 years later. Using a sample of 53 European American children, Stormshak and colleagues (1996) found sibling conflict to be significantly related to high levels of aggression and low levels of social competence. In summary, research has established linkages between sibling relationship quality and child antisocial and prosocial behaviors.

### Interplay Between Family Functioning and Sibling Relationships

Although sibling relationship quality has been shown to be associated with the development of antisocial behavior, sibling relationships do not occur in isolation, but rather as one component of interrelated dyadic subsystems (Bank et al., 2004). With this in mind, several research teams have examined the interplay between sibling relationship quality and family functioning, typically testing one of three models. According to the cross-system contagion model, the hostility that characterizes coercive processes within families, especially in parent-child relationships, often spreads to the sibling dyad and disrupts the quality of the sibling interactions (Bank et al., 2004; Ingoldsby, Shaw, Owens, & Winslow, 1999; Patterson, 1986). Cross-system contagion is often bidirectional (e.g., sibling conflict also can affect the quality of parent-child interaction) and may sustain the cycle of coercion within families (Patterson et al., 1992). Support for this model has been found in the sibling relationship literature. Erel, Margolin, and John (1998) found that high levels of marital conflict and maternal power assertion predicted high levels of sibling negativity. Brody and colleagues (1992) reported that low harmony, low cohesion, and high conflict in the family were significantly related to later levels of child-reported sibling conflict. Similarly, in a study conducted by Dunn et al. (1999), negativity in MTC and mother-sibling relationships was associated with low levels of sibling positivity and high

levels of sibling negativity. Collectively, these studies point to a possible linkage between parent-child and sibling relationships.

Researchers in the sibling literature have also tested additive models, investigating whether dimensions of sibling relationship predict antisocial behavior above and beyond the effects of parent-child interactions (Bank et al., 2004; Conger, Conger, & Scaramella, 1997; Ingoldsby et al., 2001; MacKinnon-Lewis et al., 1997). Additive models address whether sibling relationships are merely markers of other family processes (e.g., rejecting parenting) or serve as unique contexts for delinquency training. In general, studies that have tested additive models have found evidence for sibling relationships as incremental predictors of antisocial behavior after accounting for parenting effects. MacKinnon-Lewis and colleagues found that sibling aggression was a significant predictor of child aggression after controlling for maternal rejection. In a study conducted by Bank and colleagues, ineffective parenting and sibling conflict were each found to be unique and significant predictors of child antisocial behavior and affiliation with deviant peers. In contrast, Ingoldsby et al. found that the association between sibling conflict (age 5 years) and child-peer conflict was attenuated after controlling for marital conflict and mother-child conflict. However, overall, the findings suggest that sibling relationships may explain independent variance in relation to antisocial behavior after controlling for measures of family functioning.

Other investigators have examined whether negative parent-child relations may exacerbate the link between sibling relationship quality and antisocial behavior (Bank et al., 2004; Garcia et al., 2000). The focus of these interactive models, therefore, is whether children experiencing conflict in multiple versus single relational contexts would be expected to be at an increased risk for adjustment problems (Ingoldsby et al., 2001). Evidence from the literature has suggested that children who experience hostility in multiple relational domains are at increased risk for antisocial behavior. Bank and colleagues found that high levels of ineffective parenting amplified the positive association between sibling conflict and child antisocial behavior. Garcia et al. reported that children who experienced high levels of both rejecting parenting and sibling conflict (age 5 years) showed higher levels of externalizing problems compared with children with elevated levels of only one of these factors. In summary, research has suggested that experiencing adverse relations in multiple versus single contexts may elevate the risk for antisocial behavior.

### Research Goals and Hypotheses

Collectively, the body of literature suggests that sibling relationships develop within the context of other family relationship subsystems, most notably the parent-child relationship. In addition, the quality of the sibling relationship has been shown to be a significant predictor of antisocial behavior. However, this area of research has two major limitations. First, it has been conducted with small and predominantly European American, middle-class families.

The focus on European American, middle-class families for studying sibling effects on antisocial outcomes is somewhat ironic, given that most children from higher socioeconomic strata are at modest risk for high or persistent levels of serious antisocial activity, particularly compared with children from lower income backgrounds (Kilgore, Snyder, & Lentz, 2000; Linver, Brooks-Gunn, & Kohen, 2002). Second, in general, most of the studies have been focused only on one dimension of sibling relationship quality (e.g., conflict) without simultaneously examining other dimensions, such as warmth. The purpose of the current investigation was to examine the role of sibling relationship quality in the development of antisocial behavior in a sample of 208 boys from low-income families. Two dimensions of sibling relationship quality were assessed: warmth/closeness (i.e., intimacy, closeness) and conflict (i.e., antagonism, hostility). MTC negative relationship quality was also assessed at age 10. Two domains of child adjustment were measured at ages 11 and 12: antisocial behavior and TC reports of peer antisocial behavior.

The goal of the study was to test the validity of contagion, additive, and interactive models with respect to sibling relations and antisocial behavior. First, on the basis of the principles of the cross-system contagion model, we examined the link between MTC negativity and sibling relationship quality. It was hypothesized that high levels of MTC negativity would be related to high levels of sibling conflict and low levels of sibling warmth/closeness. We also investigated whether longitudinal associations would be evident between sibling relationship quality and antisocial behavior, with the expectation that children with low levels of warmth/closeness and high levels of conflict would engage in high levels of antisocial behavior and would report affiliating with antisocial peers. Second, on the basis of an additive model of sibling influence, we hypothesized that sibling relations would remain a significant predictor of antisocial behavior after controlling for MTC relations. To further ensure that these findings would be attributable to the sibling relationship, we also controlled for TC (i.e., prior adjustment) and sibling (i.e., gender, age, relation to TC) personal attributes. Finally, we investigated the interactive model by testing two- and three-way interactions involving MTC negative relationship quality, sibling warmth/closeness, and sibling conflict. It was anticipated that MTC negativity would exacerbate (or strengthen) the link between sibling relationship quality and antisocial behavior.

## Method

### *Participants and Procedure*

The sample consisted of families from the Pittsburgh Mother & Child Project (PMCP), an ongoing longitudinal project examining vulnerability and resilience (e.g., Criss, Shaw, & Ingoldsby, 2003). The sample was recruited from low-income families who were participants in the Women, Infants, and Children (WIC) Nutritional Supplement Program, which provides food supplements for income-eligible families. Initially, 421 families were approached at WIC sites when the TC were between 6 and 17 months old. Fourteen (3.3%) declined to participate at the time of recruitment,

and an additional 97 (23%) declined before the first assessment. Thus, of the 421 families asked, 310 participated in the first assessment when the TC were 1.5 years old (51.3% European American, 39.2% African American, 0.3% Hispanic, and 9.2% other; 33% of the families were single parent headed). Because the original intent of the project was to examine precursors of antisocial behavior, and funding did not permit recruitment of a sufficiently large sample of girls who were expected to show serious levels of antisocial activity, the sample was restricted to boys. At the time of the first assessment, the mothers ranged in age from 17 to 43 years ( $M = 27.82$  years,  $SD = 5.33$ ). Mean yearly family income was \$12,567.13 per year ( $SD = 7,689.02$ ), with a mean Hollingshead (1979) socioeconomic status of 23.32 ( $SD = 9.29$ ), indicative of a working-class sample. Subsequent assessments were conducted when TC were 2, 3.5, 5, 5.5, 6, 8, 10, 11, and 12 years old.

At the age 10 assessment, 252 families (81.3% of original sample) participated in a series of extensive interviews, questionnaires, and family discussion tasks. During the assessment, the TC was asked to report on his relationship with the sibling closest in age. If this sibling did not live at home, the TC was asked to choose another brother or sister. Sibling data were available from 208 families (52.4% European American, 36.5% African American, 0.5% Hispanic, and 10.6% other ethnic groups; 31.7% of the families were single parent headed; family yearly income,  $M = \$12,378.26$  per year,  $SD = 7,639.71$ ; family socioeconomic status,  $M = 23.68$ ,  $SD = 9.38$ ). Siblings (53.4% male) ranged in age from 6 to 18 years ( $M = 11.88$ ,  $SD = 2.47$ ), with considerably more being older (76.4%;  $M = 12.92$ ,  $SD = 1.71$ ) than younger (23.6%;  $M = 8.49$ ,  $SD = 1.19$ ). Nearly all of the participating siblings were biologically related to the TC (91.8% biological siblings, 3.4% stepsiblings, 3.8% half siblings, and 1% other). Participating children ( $N = 208$ ) were compared with nonparticipating children ( $N = 102$ ) at the initial recruitment when the children were 1.5 years old on indicators of maternal education, annual family income, and mother-reported toddler oppositional behavior. No significant differences were found between the two groups on any of the three measures.

### *Overview and Procedure*

Data for the present study were collected during home visits when the TC were 10 and 12 years old and during the age 11 laboratory visit. One research assistant interviewed the parent (usually mother) while another interviewed the TC. During the age 10 assessment, families (62.2% mother-TC dyads and 37.8% mother-father-TC triads) also participated in a semistructured discussion task that was videotaped. This task was based on the work of Hetherington and Clingempeel (1992) and Melby and Conger (2001). During the 8-min task, the family discussed one or two "hot" issues that they selected from a list of 24 typical family conflicts (e.g., child's choice of friends, child keeping room tidy; Hetherington & Clingempeel, 1992), from which individual and dyadic codes were subsequently rated from videotapes (e.g., conflict).

### *Measures*

*Sibling relationship quality.* During the age 10 assessment, TC completed the 32-item Sibling Relationship Questionnaire (SRQ), which was adapted from a measure developed by Furman and Buhrmester (1985). The SRQ taps psychologically meaningful qualities of the sibling relationship as they occur in a wide range of contexts. Furman and Buhrmester conducted a principal-

components analysis that yielded four underlying factors: relative status/power, rivalry, warmth/closeness, and conflict. In the current study, we focused on the latter two factors because of their expected greater relevance to the socialization of deviant behavior. Sibling warmth/closeness was based on the sum of 12 items ( $\alpha = .91$ ; e.g., "How much do you and this sibling tell each other everything?" and "How much do you and this sibling go places and do things together?") that assesses the level of intimacy, prosocial behavior, and affection in the sibling relationship. For this factor, each item was rated on a 5-point scale (with responses ranging from 1 [*hardly at all*] to 5 [*extremely much*]). Sibling conflict was assessed using 12 items ("How much do you and this sibling insult and call each other names?" and "Your sibling told a lie and got you in trouble") that tap the level of antagonism, quarreling, and overall negativity in the target's relationship with his sibling. For this factor, as 4 items were rated on a 5-point scale (with responses ranging from 1 [*hardly at all*] to 5 [*extremely much*];  $M = 11.63$ ,  $SD = 3.98$ ) and 8 items were rated on a 7-point scale (with responses ranging from 1 [*not at all in the last month*] to 7 [*more than once a day*];  $M = 22.73$ ,  $SD = 11.05$ ), items were standardized before averaging ( $\alpha = .84$ ) to create the final sibling conflict factor.

**MTC relationship quality.** MTC negative relationship quality at age 10 was created by standardizing and averaging ( $\alpha = .62$ ) scores based on three informants: mother reports, observer observational ratings coded from videotapes, and interviewer impressions. Using a 5-point Likert scale (with responses ranging from 1 [*definitely not*] to 5 [*definitely*]), mothers completed the 15-item Adult-Child Relationship Scale, an adaptation of the school-based Student-Teacher Relationship Scale (Pianta & Steinberg, 1991). This measure assesses both MTC openness/warmth (e.g., "If upset, this child seeks comfort in me") and conflict/negativity (e.g., "This child and I always seem to be struggling with one another"). After reverse scoring the five openness/warmth items, responses to all 15 items were summed ( $\alpha = .88$ ) to create the mother-reported component ( $M = 29.00$ ,  $SD = 9.70$ ) of the MTC negative relationship quality factor.

Observed MTC conflict was based on ratings from the videotaped family discussion task. Four trained coders made each of their 9-point global ratings based on two viewings of the interaction task. Observed MTC conflict ( $M = 3.09$ ,  $SD = .94$ ) was based on the mean ( $r = .59$ ,  $p < .001$ ) of two factors: mother-to-target conflict and target-to-mother conflict. Mother-to-target conflict ( $M = 3.27$ ,  $SD = 1.16$ ) was created by averaging ( $\alpha = .85$ ) eight ratings: put-downs, negative humor, complaining, conflict, emotional reactivity, rejection, commands, and nonverbal expressions of disengagement. Target-to-mother conflict ( $M = 2.91$ ,  $SD = 0.95$ ) was based on the mean ( $\alpha = .85$ ) of six ratings: complaining, conflict, emotional reactivity, rejection, interruptions, and nonverbal expressions of disengagement. Interrater reliability was established using four coders on the basis of 60 interactions (15 tapes per coder). Intraclass correlations for mother-to-target conflict ( $\rho = .70$ ;  $p < .001$ ) and target-to-mother conflict ( $\rho = .78$ ;  $p < .001$ ) were both in acceptable ranges (Mitchell, 1979). Because father-TC conflict data were available for only 37.8% of the sample, we chose to use only mother data in the construction of the observed MTC conflict variable.

The third indicator of MTC negative relationship quality was based on interviewer postassessment impressions that were rated on a 5-point Likert scale with responses ranging from 1 (*never or almost never*) to 5 (*always or almost always*). Four ratings tapped MTC negativity (e.g., "This child seemed aloof, distant, or unattached to his mother"). Five items assessed MTC positivity (e.g., "Did the parent initiate positive physical contact with the target

child?") and were reverse scored. The nine interviewer ratings were summed ( $\alpha = .81$ ) to create the interviewer-rated component ( $M = 15.89$ ,  $SD = 5.43$ ) of the MTC negative relationship quality factor.

**TC and TC-rated peer antisocial activity.** TC antisocial behavior was created by averaging ( $\alpha = .70$ ) scores based on mother, teacher, and target child reports at ages 11 and 12 years. We chose to use the mean of ages 11 and 12 years for two primary reasons. First, we believed that aggregating data from both years created more reliable and valid indicators of antisocial behavior. Second, we wanted to maximize the available data (and thus power). For instance, by combining TC antisocial behavior scores from ages 11 ( $n = 198$ ) and 12 ( $n = 195$ ) years, we were able to include more families ( $n = 205$ ) in the analyses involving antisocial behavior and sibling relations. Mother and teacher reports of TC delinquent behavior were assessed using the Child Behavior Checklist (CBC) and Teacher Report Form (TRF), respectively (Achenbach, 1991). Items on the Delinquent Behavior subscales (11 and 9 on the CBC and TRF, respectively) were rated on a 3-point scale (with responses ranging from 0 [*not true*], 1 [*somewhat true*], to 2 [*very true*]) and were summed (separately for the CBC and TRF) to create delinquent behavior factors at each age. CBC scores at ages 11 ( $\alpha = .71$ ;  $M = 2.08$ ,  $SD = 2.26$ ) and 12 ( $\alpha = .75$ ;  $M = 2.00$ ,  $SD = 2.45$ ) years were averaged ( $r = .76$ ,  $p < .001$ ) to create the mother-reported delinquent behavior component ( $M = 2.00$ ,  $SD = 2.29$ ). Likewise, the TRF delinquent behavior factor ( $M = 4.25$ ,  $SD = 3.74$ ) was based on the mean ( $r = .53$ ,  $p < .001$ ) of scores from ages 11 ( $\alpha = .85$ ;  $M = 4.34$ ,  $SD = 4.16$ ) and 12 ( $\alpha = .80$ ;  $M = 3.84$ ,  $SD = 3.43$ ). TC report of antisocial behavior (10 items) was evaluated using an abbreviated version of the Self-Report of Delinquency questionnaire (SRD; Elliott, Huizinga, & Ageton, 1985). Using a 3-point rating scale (with responses ranging from 1 [*never*], 2 [*once/twice*], to 3 [*more often*]), TC reported the extent to which they engaged in different types of antisocial behaviors (e.g., stealing, throwing rocks at people, being sent home from school for misbehavior). Several substance use items that have extremely low base rates at these ages (e.g., intravenous drug use) were deleted from the scale. Separate factors for TC behavior at ages 11 ( $\alpha = .69$ ;  $M = 1.85$ ,  $SD = 2.25$ ) and 12 ( $\alpha = .71$ ;  $M = 1.85$ ,  $SD = 2.23$ ) were created by summing items. TC reports of antisocial behavior ( $M = 1.81$ ,  $SD = 1.94$ ) were based on the mean ( $r = .57$ ,  $p < .001$ ) of scores at ages 11 and 12.

Fourteen items assessing TC-reported peer antisocial behavior (e.g., "Have any of your friends broken the law?") were evaluated using the SRD (Elliott et al., 1985), with the wording modified to reflect the behavior of the TC's friends. These items were rated on a 3-point Likert scale (with responses ranging from 1 [*never*], 2 [*once/twice*], to 3 [*more often*]) and are similar to those used in previous studies (e.g., Dishion, Patterson, Stoolmiller, & Skinner, 1991; Laird, Pettit, Dodge, & Bates, 1999). Because the 14 items displayed adequate base rates, none were omitted. Factors at ages 11 ( $\alpha = .87$ ;  $M = 3.92$ ,  $SD = 4.09$ ) and 12 ( $\alpha = .83$ ;  $M = 3.54$ ,  $SD = 4.02$ ) years were based on the sum of the 14 items. TC reports of peer antisocial behavior were created by averaging ( $r = .62$ ;  $p < .001$ ) scores from ages 11 and 12.

**Prior TC antisocial behavior.** Prior TC antisocial behavior was based on the mean ( $r = .33$ ,  $p < .001$ ) of mother (age 8) and teacher (ages 8 and 9) reports of TC externalizing behavior using the CBC and TRF, respectively (Achenbach, 1991). Items on the Externalizing Behavior subscales (33 and 34 on the CBC and TRF, respectively) were summed at age 8 years ( $\alpha = .97$ ;  $M = 10.44$ ,  $SD = 7.67$ ) for the CBC and at ages 8 ( $\alpha = .96$ ;  $M = 11.40$ ,  $SD = 14.01$ ) and 9 ( $\alpha = .90$ ;  $M = 14.58$ ,  $SD = 14.35$ ) years for the TRF.

## Results

### *Descriptive Statistics and Bivariate Correlations*

Bivariate correlations and descriptive statistics are presented in Table 1. Intercorrelations (two-tailed) among study variables indicated expected patterns of covariation within and between variable domains. Sibling warmth/closeness was significantly related to low levels of sibling conflict, and TC antisocial behavior was significantly related to TC reports of peer antisocial behavior. In addition, MTC negative relationship quality was significantly related to high levels of TC antisocial behavior and TC reports of peer antisocial behavior.

For our first research question, we utilized the cross-system contagion model to see whether MTC negative relationship quality would be related to sibling relations. The results indicated that MTC negativity was positively and significantly related to sibling conflict (see Table 1). However, bivariate correlations indicated that MTC negative relationship quality was unrelated to sibling warmth/closeness. In addition, we examined whether sibling relationship quality was associated with subsequent youth antisocial behavior, and found that sibling conflict was positively and significantly associated with TC antisocial behavior and TC reports of peer antisocial behavior (see Table 1). Sibling warmth/closeness was found to be unrelated to TC antisocial behavior but was positively correlated with TC reports of peer antisocial behavior.

### *Multiple Regressions*

Next, we tested (a) whether sibling warmth/closeness and conflict were significant predictors of antisocial behavior after controlling for the MTC relationship and characteristics of the TC and sibling (i.e., additive model) and (b) whether MTC negativity moderated the link between sibling relations and antisocial behavior (i.e., interactive model). Two regressions were computed in which antisocial behavior (TC antisocial behavior or TC reports of peer antisocial behavior) was predicted by sibling gender, sibling relation to TC, sibling age, and prior TC antisocial behavior (Step 1); MTC negative relationship quality (Step 2); sibling warmth/closeness and sibling conflict (Step 3); Warmth/Closeness  $\times$  Conflict, Warmth/Closeness  $\times$  MTC Relationship Quality, and Conflict  $\times$  MTC Negative Relationship Quality (Step 4); and Warmth/Closeness  $\times$  Conflict  $\times$  MTC Negativity (Step 5).

The results demonstrated that sibling relationship quality explained a significant and incremental percentage of variance in antisocial behavior after controlling for sibling and TC characteristics and MTC relations (see Table 2). Inspection of the standardized betas indicated that sibling conflict was positively and significantly related to TC antisocial behavior and TC reports of peer antisocial behavior; sibling warmth/closeness was positively related to TC reports of peer antisocial behavior. Though warmth/closeness and TC antisocial behavior were not significantly associated in the bivariate correlation analyses, results from the regressions demonstrated that high levels of warmth and closeness in the sibling dyad were related to high levels of antisocial behavior, indicative of a suppressor effect. The findings also indicated that none of the two- or three-way interactions were significant on Steps 4 and 5 of the regressions, respectively. That is, MTC negativity did not qualify the association between sibling relationship quality and antisocial behavior.

We also examined whether the associations involving sibling relationship quality were moderated by marital status (i.e., single vs. married/cohabiting), TC ethnicity (i.e., European American vs. ethnic minorities), sibling gender (i.e., male vs. female), sibling age, and sibling relation to TC (i.e., biological vs. nonbiological sibling). None of the two-way interactions (e.g., Sibling Warmth/Closeness  $\times$  Sibling Age) tested in multiple regressions were significant.

## Discussion

The purpose of the present study was to examine the association between sibling relationship quality and antisocial behavior. In addition, we investigated the interplay between the sibling and MTC dyadic subsystems by testing three models: cross-system contagion, additive, and interactive. The findings indicated that conflict in sibling dyads was positively related to TC antisocial behavior and TC reports of peer antisocial behavior; sibling warmth/closeness was positively related to TC reports of peer antisocial behavior. Consistent with a cross-system contagion perspective, MTC negativity was associated with high levels of sibling conflict. Furthermore, in support of the additive model, sibling warmth/closeness and conflict were both significantly related to antisocial behavior after accounting for variance associated with MTC relations and TC and sibling attributes. Finally, no support was found for an interactive framework, as the association between sibling

Table 1  
*Bivariate Correlations and Descriptive Statistics*

Variable	2	3	4	5	<i>n</i>	<i>M</i>	<i>SD</i>
1. Sibling warmth/closeness	-.31***	-.11	.10	.24***	208	3.11	.89
2. Sibling conflict		.29***	.26***	.22**	208	0.00	.61
3. MTC negative relationship quality			.46***	.36***	207	0.02	.77
4. TC antisocial behavior				.62***	205	0.02	.78
5. TC reported peer antisocial behavior					201	3.76	3.87

Note. Bivariate correlation  $ns = 200-208$ . MTC = mother-target child; TC = target child.  
\*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 2  
Multiple Regression Models for TC and TC-Reported Peer Antisocial Behavior

Step	Predictor	TC antisocial behavior (n = 204)			TC-reported peer antisocial behavior (n = 200)		
		Std. $\beta$	$\Delta R^2$	$R^2$	Std. $\beta$	$\Delta R^2$	$R^2$
Step 1	Sibling gender <sup>a</sup>	-.04	.33***	.47***	-.06	.09***	.30***
	Sibling relation to TC <sup>b</sup>	-.01			-.08		
	Sibling age	-.10			-.02		
Step 2	Prior TC antisocial behavior <sup>c</sup>	.57***			.29***		
	MTC negative relationship quality	.31***	.08***		.30***	.08***	
	Sibling warmth/closeness	.18**	.04***		.34***	.11***	
Step 3	Sibling conflict	.18**			.20**		
	Sibling Warmth/Closeness $\times$ Sibling Conflict	.03	.00		-.04	.01	
Step 4	Sibling Warmth/Closeness $\times$ MTC Negative Relationship Quality	.00			.10		
	Sibling Conflict $\times$ MTC Negative Relationship Quality	.03			.08		
Step 5	Warmth/Closeness $\times$ Conflict $\times$ MTC Negative Relationship Quality	-.02	.00		-.10	.01	

Note. MTC = mother-target child; TC = target child; Std. = standardized.  
<sup>a</sup> Coded -1 = female and +1 = male. <sup>b</sup> Coded -1 = biological sibling and +1 = nonbiological sibling. <sup>c</sup> Based on mean of mother and teacher reports of externalizing behavior at ages 8 and 9 years.  
 \*\*  $p < .01$ . \*\*\*  $p < .001$ .

relationship quality and antisocial behavior was not moderated by MTC negativity.

In the current study, and in accord with the extant literature (e.g., Bank et al., 2004; Conger et al., 1997; Garcia et al., 2000; Ingoldsby et al., 2001; Stocker et al., 2002), children whose sibling relationships were characterized by elevated levels of conflict displayed high levels of antisocial behavior and reported affiliating with antisocial peers. As others have speculated (e.g., Compton et al., 2003; Patterson, 1986), sibling relationships marked by high rates of acrimony may provide a training ground for learning aggressive behavioral tactics, which, in turn, can be applied to other contexts. The coercive and hostile exchanges that characterize these relationships could reinforce children's use of antisocial behavior and potentially lead them to delinquent-reinforcing contexts, such as affiliating with deviant peers (Patterson et al., 1992). Moreover, experiences in such relationships would not be very conducive in the development of emotional regulation and understanding, which some researchers have posited as an important function of sibling relationships (Dunn, 1999). Although these behavioral and emotional strategies may be more likely modeled from an older sibling (Patterson, 1986), experiencing hostile exchanges with a younger sibling on a regular basis and being successful at using such strategies may increase the probability that the child would engage in such behaviors outside of the relationship. In summary, the results are consistent with the notion that conflictual sibling relationships may serve as contexts for delinquency training for boys in middle childhood.

Findings also indicated that sibling warmth/closeness was positively related to TC reports of peer antisocial behavior and TC antisocial behavior, even after controlling for MTC and sibling conflict. Consistent with research indicating that children may be led to delinquent-reinforcing circumstances by their siblings (e.g., deviant peers; Patterson, 1986; Rowe & Gulley, 1992), the findings suggest that children may be more receptive to the recommendations of their brothers and sisters in the context of warm and close relationships. The results are analogous to studies of parent-child relationship quality, which demonstrate greater child receptivity to parental socialization in the context of a warm and mutually responsive relationship (e.g., Criss et al., 2003; Kochanska, 1997). It should be noted that the positive association between sibling warmth/closeness and TC reports of peer antisocial behavior may have been due to or inflated because of the monomethod approach to the assessment of each variable (i.e., based only on TC reports). Ideally, it would have been desirable to have peer rather than TC reports of peer antisocial behavior. As using the same informant and method for independent and dependent variables are subject to bias, this represents a notable methodological limitation of the study. Also, the positive association between warmth/closeness and TC antisocial behavior occurred only after accounting for MTC negativity and sibling conflict in the regression analyses. This suppressor effect could be attributable to characteristics of the sibling. That is, it is possible that having a close relationship with a deviant sibling may place a child at risk for the

development of antisocial behavior. However, because sibling antisocial behavior was not assessed in the current study, this possibility is merely speculative.

In the present study, MTC relationships characterized by negativity were associated with antagonism and conflict in the sibling relationship. These associations were cross-sectional, but do echo previous findings in the literature (Brody et al., 1992; Compton et al., 2003; Dunn et al., 1999; Erel et al., 1998; Ingoldsby et al., 2001) and do support the cross-system contagion model (Bank et al., 2004). It is possible that children who experience hostile interactions with their parents incorporate these coercive strategies into their behavioral repertoires, which, in turn, are extended to other relationships. Another possibility is that because family relationships are permeable, the negative affect and irritability that characterize poor parent-child relationships may spill over and lead to negative interactions in the sibling dyad (Patterson, 1986). Given the cross-sectional nature of these data, however, it must be acknowledged that it is equally possible that sibling discord may influence the quality of parent-child relationships. That is, siblings who constantly fight and argue may increase conflict between parents and children.

Interestingly, MTC negative relationship quality was unrelated to sibling warmth/closeness. Although few studies have explored the link between family functioning and positive sibling relational attributes (see Dunn et al., 1999, for an exception), it had been expected that high levels of MTC negativity would be associated with less warm sibling relationships. These findings could be due to the age of the participating siblings, who on average were older than the TC. Given that children often take on caregiving responsibilities for younger siblings, especially in dual-earner or single-parent families (Zukow-Goldring, 2002), it is possible that many target children were required to spend time with their older brothers or sisters out of necessity and irrespective of the quality of the relationship with their mothers. With limited resources and lack of mobility, 10-year-olds may have no other options but to spend time with their older siblings.

Results from the multiple regression analyses indicated that sibling relationship quality remained a significant predictor of target children antisocial behavior and TC reports of peer antisocial behavior after statistically controlling for MTC negativity and TC and sibling characteristics. These findings are in accordance with the additive model and suggest that sibling relational attributes are not merely indicators of overall family functioning. Instead, sibling interactions may provide children with unique socialization experiences in the development of antisocial behavior (Bank et al., 2004; McKinnon-Lewis et al., 1997). These unique experiences could be attributable to the differential balance of power in parent-child and sibling relationships. Sibling relationships tend to be horizontal or balanced (i.e., both partners share responsibility during interactions; Burhmester & Furman, 1990), whereas parent-child relationships are generally more vertical and unilateral (i.e., parents dictate the direction of interactions; Russell, Pettit, & Mize,

1998). Thus, these unique interaction styles may afford children unique experiences in delinquency training.

In contrast to the interactive model and findings from previous investigations (e.g., Bank et al., 2004; Garcia et al., 2000), associations between sibling relationships and antisocial behavior were not found to vary as a function of MTC negativity level. These results provide further support for the importance of brothers and sisters as socializing agents in the development of antisocial behavior. The findings also suggest that MTC relationships may not ameliorate (or exacerbate) the influence of siblings on child development. Although moderating effects in nonexperimental studies can be difficult to detect (McClelland & Judd, 1993), the inability to find significant interactions may have been due to the measure of MTC relationship quality; other dimensions of the MTC dyad, such as communication and responsiveness, may be more relevant to attenuating sibling effects on youth antisocial behavior.

### *Implications for Prevention and Intervention*

The study's findings are especially relevant for prevention and intervention efforts. As it represents one of the first studies to demonstrate sibling effects on a sample of low-income children, the current findings may have salient implications for interventionists working with problematic school-age children from low-income backgrounds. As the environments of many children from low-income families are embedded within layers of risk within (e.g., stability of family structure) and outside (e.g., quality of neighborhood and school) of the home, relationships children have with siblings may play a relatively more important role than in middle-class contexts, to the extent that delinquency training modeled in the home is more likely to be condoned in low-income extrafamilial contexts. Findings from the current study confirm previous research on predominantly middle-class families, indicating that siblings (who tended to be older in this sample) exert an independent influence on children's socialization experience, providing a training ground that supplements the influence of parents. The finding is also in accord with research on family-based interventions targeting older sibling antisocial behavior, in which decreases in the TC's antisocial behavior were associated with later reductions in court appearances of non-treated younger siblings (Klein, Alexander, & Parsons, 1977). More recent prevention efforts have also incorporated the potential influence of older siblings into treatment designs. For instance, Olds's (2002) preventive intervention targeting high-risk mothers during pregnancy and infancy is open only to parents rearing their first-born child, in part, because of the novel challenges associated with raising a first child. However, improved functioning of the first-born child should also have benefits for the later born children because of sibling effects. More germane to the developmental period of the boys in the current study, Bank and Snyder (2004) examined the efficacy of a parent-training approach to treating school-age children's conduct problems. Results indicated that both older and younger siblings were shown to benefit from the sibling-plus-parent-training

intervention (as compared with parent training alone or community control). The results of this study should be quite informative for clinical practice in addressing the impact of siblings on problem children's behavior.

### *Limitations and Suggestions for Future Research*

It should be noted that the current sample consisted of boys (and their mothers) from low-income families. As such, these findings can only be generalized to these types of families. Future research would benefit from an examination of other family subsystems involving fathers, daughters, or even sibling triads. Sibling relationship quality and peer antisocial behavior were based only on the perceptions of the TC. Inclusion of other sources of information (e.g., siblings, peers) and methods (e.g., observation) might provide more insight into the complex and dynamic interplay of sibling relationships and its impact on child adjustment. Also, the associations between sibling relationship quality and MTC relationship quality were cross-sectional in nature, and, as such, the directionality of these associations cannot be fully ascertained from these data. Assessing these constructs at multiple time points would allow researchers to test transactional models of the links between sibling relationship quality and family and child functioning, and also explore developmental trajectories and pathways in sibling relations. Likewise, examining more long-term associations between sibling relationship quality and antisocial behavior would illuminate whether the influence of siblings extends beyond a few years. Finally, it would be informative to examine sibling antisocial behavior, both as an outcome of sibling interactions and as a moderator in the link between sibling relationship quality and TC antisocial behavior. Having a supportive relationship with a highly aggressive sibling may be associated with more detrimental outcomes compared with affiliations with less aggressive siblings.

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